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Unit 3, Lesson 6: Interpreting Rates

Let's explore unit rates.

6.1: Something per Something

Think of two things you have heard described in terms of "something per something."

6.2: Cooking Oatmeal

Priya, Han, Lin, and Diego are all on a camping trip with their families. The first morning, Priya and Han make oatmeal for the group. The instructions for a large batch say, "Bring 15 cups of water to a boil, and then add 6 cups of oats."

- Priya says, "The ratio of the cups of oats to the cups of water is 6: 15. That's 0.4 cups of oats per cup of water."
- Han says, "The ratio of the cups of water to the cups of oats is 15: 6. That's 2.5 cups of water per cup of oats."

- Who is correct? Explain your reasoning. If you get stuck, consider using the table.

water (cups)	oats (cups)
15	6
$\div 15$ 1	$0.4 \div 15$
$\div 6$ 2.5	1 $\div 6$
$\times 5$ 12.5	5 $\times 5$
10 $\times 10$	10 $\times 4$

$$\begin{array}{r} 0.4 \\ 15 \overline{) 6.00} \\ \underline{60} \\ 0 \end{array}$$

$$\begin{array}{r} 2.5 \\ 6 \overline{) 15.0} \\ \underline{12} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

- The next weekend after the camping trip, Lin and Diego each decide to cook a large batch of oatmeal to have breakfasts ready for the whole week.

- Lin decides to cook 5 cups of oats. How many cups of water should she boil?

$$\begin{array}{r} 2.5 \\ \times 5 \\ \hline 12.5 \end{array}$$

She should boil 12.5 cups of water.

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- b. Diego boils 10 cups of water. How many cups of oats should he add into the water?

He should ^{boil} 4 cups of oats.

3. Did you use Priya's rate (0.4 cups of oats per cup of water) or Han's rate (2.5 cups of water per cup of oats) to help you answer each of the previous two questions? Why?

I used Han's rate for a and Priya's rate for b.
Han's rate told how much for one cup of oats so I could easily multiply times 5 to find the answer to A. Priya's rate was for 1 cup of water so I multiplied that times 10 for the answer to B.

6.3: Cheesecake, Milk, and Raffle Tickets

For each situation, find the **unit rates**.

1. A cheesecake recipe says, "Mix 12 oz of cream cheese with 15 oz of sugar."

- a. How many ounces of cream cheese are there for every ounce of sugar?

$$\frac{12}{15} = \frac{4}{5} = 0.8 \text{ ounces cream cheese per ounce of sugar}$$

- b. How many ounces of sugar is that for every ounce of cream cheese?

$$\frac{15}{12} = \frac{5}{4} = 1\frac{1}{4} = 1.25 \text{ ounces sugar for every ounce of cream cheese}$$

2. Mai's family drinks a total of 10 gallons of milk every 6 weeks.

- a. How many gallons of milk does the family drink per week?

$$\frac{10}{6} = \frac{5}{3} = 1\frac{2}{3} \text{ gallons per week}$$

- b. How many weeks does it take the family to consume 1 gallon of milk?

$$\frac{6}{10} \text{ week} = \frac{3}{5} = 0.6 \text{ week to consume 1 gallon of milk}$$

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3. Tyler paid \$16 for 4 raffle tickets.

a. What is the price per ticket?

$$\frac{16}{4} = \$4 \text{ per ticket}$$

b. How many tickets is that per dollar?

$$\frac{4}{16} = \frac{1}{4} \text{ ticket per dollar}$$

4. For each problem, decide which unit rate from the previous situations you prefer to use. Next, solve the problem, and show your thinking.

a. If Lin wants to make extra cheesecake filling, how much cream cheese will she need to mix with 35 ounces of sugar?

0.8 oz cream cheese per ounce of sugar

$$\begin{array}{r} 35 \\ \times 0.8 \\ \hline 28.0 \end{array}$$

28 ounces of cream cheese
w/ 35 ounces of sugar

b. How many weeks will it take Mai's family to finish 3 gallons of milk?

0.6 weeks to consume 1 gallon milk

$$\begin{array}{r} 0.6 \\ \times 3 \\ \hline 1.8 \end{array}$$

1.8 weeks to consume 3 gallons of milk

c. How much would all 1,000 raffle tickets cost?

\$4 per ticket

$$\begin{array}{r} 1,000 \\ \times 4 \\ \hline 4,000 \end{array}$$

\$4,000 for 1,000 tickets

Are you ready for more?

Write a "deal" on tickets for Tyler's raffle that sounds good, but is actually a little worse than just buying tickets at the normal price.

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Lesson 6 Summary

Suppose a farm lets us pick 2 pounds of blueberries for 5 dollars. We can say:

blueberries (pounds)	price (dollars)
2	5
1	$\frac{5}{2}$
$\frac{2}{5}$	1

- We get $\frac{2}{5}$ pound of blueberries per dollar.
- The blueberries cost $\frac{5}{2}$ dollars per pound.

The “cost per pound” and the “number of pounds per dollar” are the two *unit rates* for this situation.

A **unit rate** tells us how much of one quantity for 1 of the other quantity. Each of these numbers is useful in the right situation.

If we want to find out how much 8 pounds of blueberries will cost, it helps to know how much 1 pound of blueberries will cost.

blueberries (pounds)	price (dollars)
1	$\frac{5}{2}$
8	$8 \cdot \frac{5}{2}$

If we want to find out how many pounds we can buy for 10 dollars, it helps to know how many pounds we can buy for 1 dollar.

blueberries (pounds)	price (dollars)
$\frac{2}{5}$	1
$10 \cdot \frac{2}{5}$	10

Which unit rate is most useful depends on what question we want to answer, so be ready to find either one!